

The role of the feed additive bentonite and protein intake on animal performance and gastrointestinal nematode control in confined Santa Inês lambs



A.C.S. Chagas¹, F.C. Fávero², R. Gigliotti³, S.C. Boghi³, M.C.D. Beraldo³, A.C.C. Bernardi¹, S.N. Esteves¹, M.C.S. Oliveira^{1*}

¹ Embrapa Pecuária Sudeste (Southeast Livestock Unit), São Carlos, São Paulo, Brazil *marcia@cnpse.embrapa.br

² Universidade Estadual Paulista Júlio de Mesquita Filho, Jaboticabal, São Paulo, Brazil

³ Centro Universitário Central Paulista, São Carlos, São Paulo, Brazil

INTRODUCTION

Infection by gastrointestinal nematodes (GINs) is major obstacle in small ruminant production in tropical regions, where the climate conditions favor the dynamics of parasite populations. Sheep production has been increasing, but is still small in São Paulo state, making this region a large importer of lamb and mutton from other Brazilian states as well as from other countries (Verissimo et al., 2012).

The initial aim of this study was to verify the effect of supplementation with the clay mineral bentonite on infection by GINs in Santa Inês lambs kept in confined conditions. Consequently, the impact of a rich-protein diet on this parameter was also verified.

METHODS

Forty-eight animals were used, weaned at 90 days of age and with average eggs per gram counts (EPG) of 4,969, divided into 4 treatments of 12 animals each. Three groups received 25, 50 or 75 g of bentonite daily (T25, T50 and T75) and the control group received no supplement (T0). The roughage used was corn silage, with a concentrate: roughage ratio of 72:28 of dry matter. The diet contained 17.2% crude protein and 77.3% TDN on a dry matter basis.

The animals remained confined for up to 85 days. The EPG were counted, coprocultures were performed and the packed cell volume (PCV) and total serum proteins (TSP) were determined. The bentonite clay chemical composition was obtained by analysis X-ray fluorescence spectroscopy. The EPG values were transformed into $\log_{10}(n+1)$ using the GLM procedure and the means were analyzed by the Tukey test.

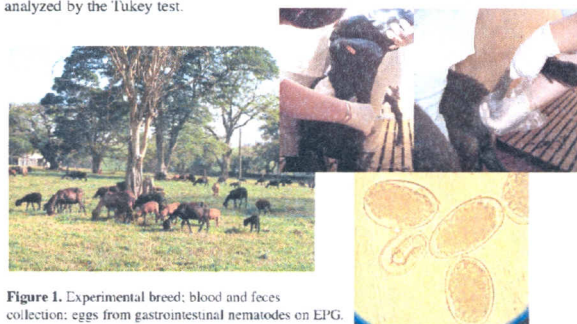


Figure 1. Experimental breed; blood and feces collection; eggs from gastrointestinal nematodes on EPG.

RESULTS

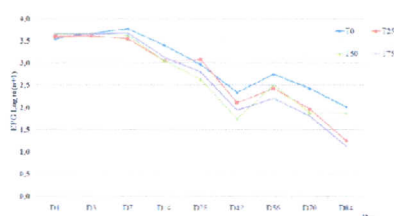


Figure 2. Reduction of average eggs per gram (EPG $\log_{10}(n+1)$) in confined Santa Inês lambs that received a diet rich in protein (17.2%) and bentonite (0, 25, 50 e 75 g/animal/day) in the four experimental groups of 12 animals each.

Table 1. Means followed by standard deviations of the packed cell volume (PCV, %), eggs per gram (EPG, $\log_{10}(n+1)$) and total serum proteins (TSP, g/dL) by treatment and sex in confined Santa Inês lambs treated with bentonite (0, 25, 50 and 75 g/animal/day).

Treatments	Log EPG	PST	PCV
T0	2.99±0.06a	5.60±0.14a	37.19±0.50a
T25	2.74±0.06a	5.44±0.15a	37.20±0.53a
T50	2.74±0.06a	5.75±0.14a	36.99±0.50a
T75	2.67±0.06a	5.62±0.14a	36.23±0.59a
Female	2.70±0.043a	5.64±0.10a	38.12±0.35a
Male	2.88±0.045a	5.56±0.10a	35.69±0.36b

*Different mean PCV values between males and females ($P=0.03$)

Table 2. Total mean eggs per gram (EPG) according to bentonite treatment (0, 25, 50 and 75 g/animal/day), mean EPG per day and efficacy in reduction of EPG in relation to day 1 in confined Santa Inês lambs receiving a protein-rich diet (17.2%).

Treatment	D1	D3	D7	D14	D28	D42	D56	D70	D84	Total Average
0	4254.2	5293.7	6810.0	3187.5	1800.0	779.2	1608.3	400.0	177.3	2701.1
25	4616.7	5172.9	5729.2	1408.3	1508.3	350.0	531.8	283.6	77.3	2184.2
50	5391.7	5289.6	5187.5	1808.3	750.8	245.8	900.0	179.2	158.3	2212.4
75	5616.7	5414.6	5962.5	1966.7	1375.0	720.8	375.0	200.0	95.5	2414.1
Daily Average	4969.8	5292.7	5922.3	2692.7	1358.5	523.0	853.8	260.7	127.1	
Efficacy	0.0	0.0	0.0	57.9	72.7	89.5	83.8	94.7	97.4	

Table 3. Mean of nematode species from coprocultures (%) in confined Santa Inês lambs treated with bentonite (0, 25, 50 and 75 g/animal/day).

Nematode	T0	T25	T50	T75	Total
<i>Haemonchus contortus</i>	74.6	66.4	80.2	81.6	75.7
<i>Trichostrongylus</i> sp.	23.4	29.6	19.2	15.8	22.0
<i>Cooperia</i> sp.	2.0	4.0	0.6	2.6	2.3
Total	100	100	100	100	100

Conclusions

- ✦ The supplementation with bentonite did not influence the levels of infection by GINs as well as the weight gain relative to the control group;
- ✦ The rich-protein diet reduced the total average EPG in relation to day 1 (D1) of the experiment in 58% on D14 and reached 97% on D84;
- ✦ The substantial reduction in the EPG in all the experimental groups confirms the hypothesis that the diet was sufficient to inhibit infection by GINs in confined Santa Inês lambs with no need for anthelmintic treatment.

Financial support: MP1 Embrapa - 01.10.01.001.05.05

This study is available on:

http://www.cnpse.embrapa.br/mcs/dstaul/htcs/principal/publicacao/Comunicado100_0.pdf

REFERENCE

Verissimo CJ, Nicura SCM, Alberti ALL, Rodrigues CFC, Barbosa CMP, Chiebao DP, Cardoso D, Silva GS, Pereira JR, Margallo LFF, Costa RLD, Nardon RF, Ueno TEH, Curci VCLM, Molento MB. Multidrug and multispecies resistance in sheep flocks from São Paulo state, Brazil. Vet Parasitol 2012;187:209-216.



Ministério da
Agricultura, Pecuária
e Abastecimento

